## **CH-1 MATTER IN OUR** SURROUNDINGS

#### **KEY POINTS:**

#### Matter:

- Anything that occupies space and has mass is called matter.
- It exists in the form of five basic elements, the Panch tatva air, earth, fire , sky and water.
- For example: Chair, bed, river, mountain, dog, tree, building, etc.
- Characteristics of matter:
- Matter is made up of small particles called atoms. •
- These particles are too small to be observed with naked eye.
- These particles are constantly moving constantly.
- These particles have spaces between them.
- Particles of matter attract each other because of the force of attraction. Diffusion:

Particles of matter intermix on their own with each other. They do so by getting into the spaces between the particles. This intermixing of particles of two different types of matter on their own is called diffusion.

#### **Basis of Classification of Matter:**

- Based upon particle arrangement
- Based upon energy of particles
- Based upon distance between particles Three States of Matter:



#### **Temperature: Common and SI units**

- Common unit: Degree Celsius (°C)
- SI unit: Kelvin (K)
- Relation between common unit and SI unit of temperature:

#### $0 \,^{\circ}\text{C} = 273\text{K}$

#### Change of State of Matter:

Physical states of matter can be inter-converted into each other by following two ways: 1. By changing the temperature

2. By changing the pressure

#### 1. Effect of Change of Temperature: Solid to liquid:

- On increasing the temperature of solids, the kinetic energy of the particles increases which overcomes the forces of attraction between the particles thereby solid gets converted to a liquid.
- **Melting:** Change of solid state of a substance into liquid is called melting.
- Melting point: The temperature at which a solid melts to become a liquid at the atmospheric pressure is called its melting point.
- Melting point of ice is 0°c. (a) Liquid to gas:

#### EXTRA QUESTIONS:

#### 1. What happens when you pour some acetone (nail polish remover) on your palm?

ANS : The particles gain energy from your palm or surroundings and evaporate causing the palm to feel cool.

**2.** After a hot sunny day, people sprinkle water on the roof or open ground. Why? Give reason After a hot sunny day, people sprinkle water on the roof or open ground because the large latent heat of vaporisation of water helps to cool the hot surface.

#### 3. Why should we wear cotton clothes in summer?

During summer, we perspire more because of the mechanism of our body which keeps us cool. We know that during evaporation, the particles at the surface of the liquid gain energy from the surroundings or body surface and change into vapour. The heat energy equal to the latent heat of vaporisation is absorbed from the body leaving the body cool. Cotton, being a good absorber of water helps in absorbing the sweat and exposing it to the atmosphere for easy evaporation.

#### 4. Why do we see water droplets on the outer surface of a glass containing ice-cold water?

Let us take some ice-cold water in a tumbler. Soon we will see water droplets on the outer surface of the tumbler. The water

vapour present in air, on coming in contact with the cold glass of water, loses energy and gets converted to liquid state, which we see as water droplets.

# 5. When a crystal of potassium permanganate is placed in a beaker containing water, its purple colour spreads throughout the water. What do you conclude from this observation about the nature of potassium permanganate and water?

Answer:

When we place few crystals of potassium permanganate in a beaker containing water, we ret two distinct layers—colourless water at the top and pink colour at the bottom. After fer onir use, pink colour spreads and whole solution turns pink due to diffusion. Since potassium rerminganate is a solid substance, it does not possess so much space. Water molecules that chould state, collide with solid particles and intermix due to sufficient space between molecules.

#### 6. Why do solids have a regular grow the shape?

Answer:

In solids, the particles have orghly ordered are generated as a second particles are very storing. Therefore, Solife have a regular geometrical shape.

#### 7. Why are gases compressible but not liquids?

Answer:

Gases are compressible because the intermolecular space is very large in gases, whereas liquids are not compressible because in liquids, the intermolecular space is less.

#### 8. Can a rubber band change its shape on stretching? Is it a solid?

Answer:

Yes, a rubber band changes shape under force and regains the same shape when the force is removed. It breaks on applying excessive force. Yes, it is a solid.

### 9. What do you understand by the term 'latent heat of fusion'? How much is the latent heat of fusion of ice?

#### Answer:

The amount of heat that is required to change 1 kg of solid into liquid at atmospheric pressure without any change in temperature at its melting point, is known as latent heat of fusion. The latent heat of fusion of ice in SI unit is  $3.35 \times 10^5$  J/kg.

#### 10. Which gas is called dry ice? Why?

#### Answer:

Solid CO<sub>2</sub> is known as dry ice. This is because it directly gets converted into gaseous state without passing through liquid state on decreasing the pressure to 1 atmosphere.

- We already know that -
  - $_{\circ}$   $\,$  Particles of matter are never at rest
  - o Particles of matter possess different amounts of kinetic energy
- The particles of liquids have more kinetic energy. Therefore, they are able to overcome the forces of attraction and convert into vapour without any external forces.
- Evaporation The phenomenon of change of a liquid into vapours at any given temperature below its boiling point is called Evaporation. Evaporation is different than boiling, as shown in the figure below.



#### How evaporation causes cooling?

The process of evaporation uses the energy of the liquid particles. Therefore, the particles absorb energy from the surroundings in order to compensate the energy that is being lost in the process of evaporation. This results in cooling of the surrounding area.